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PART II

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

■

TELECOMMUNICATIONS

Proposed Standards

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

[29 CFR Part 1910]

TELECOMMUNICATIONS

Proposed Safety and Health Standards

Pursuant to section 6(b) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1593; 29 U.S.C. 655), Secretary of Labor's Order No. 12–71 (36 FR 8754) and 29 CFR 1911.11, it is hereby proposed to establish Safety and Health Standards relating to work involved in the provision of telecommunications services. The foremost concern of these standards is to assure that telecommunication workers will take proper precautionary measures and have proper training with respect to them and will use appropriate protective equipment in the carrying out of their duties. The primary hazards to which these standards are directed relate to the prevention of injuries caused by electricity and falling.

As helicopters and aerial lifts are frequently used in telecommunication work as well as in other industries, this notice also proposes to make the current standards relating to their use in construction (29 CFR 1926.551 & .556) generally applicable. The standards proposed herein are not intended to apply to construction which is specifically the subject of 29 CFR Part 1926.

The proposed new Subpart T—"Telecommunications" is substantially based on the recommendations of a 28-member telecommunications standards committee. The committee included representatives of telephone companies, communications unions, and other affected groups.

Written data, views, and arguments concerning the proposal may be mailed to the Office of Standards, Occupational Safety and Health Administration, Attention S. Patti, Room 308, 400 First Street, NW, Washington, D.C. 20001, at any time prior to October 12, 1973. The data, views, and arguments will be available for public inspection and copying at the above address.

Oral and written views, and arguments will be received by an administrative law judge to be assigned by the Chief Administrative Law Judge of the United States Department of Labor at a hearing beginning at 10 a.m. on October 24, 1973, in Room 107 of the United States Department of Labor Building, 14th Street and Constitution Avenue, NW, Washington, D.C. Persons desiring to appear at the hearing must file with the Office of Standards a notice of intention to appear, no later than October 15, 1973. The notice must state the name and address of the person to appear, the capacity in which he will appear, and the approximate amount of time required for his presentation. The notice must also include, or be accompanied by, a statement of the positions to be taken and of the evidence to be adduced in support of them.

The hearing shall be conducted and the decision thereafter shall be made in accordance with the rules of procedure in 29 CFR Part 1911.

1. A new § 1910.185 would be added to 29 CFR Part 1910 to read as follows:

§ 1910.185 Helicopters.

(a) *Helicopter regulations.*—Helicopter cranes shall be expected to comply with any applicable regulations of the Federal Aviation Administration.

(b) *Briefing.*—Prior to each day's operation a briefing shall be conducted. This briefing shall set forth the plan of operation for the pilot and ground personnel.

(c) *Slings and tag lines.*—Load shall be properly slung. Tag lines shall be of a length that will not permit their being drawn up into rotors. Pressed sleeve, swedged eyes, or equivalent means shall be used for all freely suspended loads to prevent hand splices from spinning open or cable clamps from loosening.

(d) *Cargo hooks.*—All electrically operated cargo hooks shall have the electrical activating device so designed and installed as to prevent inadvertent operation. In addition, these cargo hooks shall be equipped with an emergency mechanical control for releasing the load. The hooks shall be tested prior to each day's operation to determine that the release functions properly, both electrically and mechanically.

(e) *Personal protective equipment.*—(1) Personal protective equipment for employees receiving the load shall consist of complete eye protection and hardhats secured by chinstraps.

(2) Loose-fitting clothing likely to flap in downwash and thus be snagged on hoist line, shall not be worn.

(f) *Loose gear and objects.*—Every practical precaution shall be taken to provide for the protection of the employees from flying objects in the rotor downwash. All loose gear within 100 feet of the place of lifting the load, depositing the load, and all other areas susceptible to rotor downwash shall be secured or removed.

(g) *Housekeeping.*—Good housekeeping shall be maintained in all helicopter loading and unloading areas.

(h) *Operator responsibility.*—The size and weight of loads, and the manner in which loads are connected to the helicopter shall be checked. The helicopter operator shall not make a lift if he believes the lift cannot be made safely.

(i) *Hooking and unhooking loads.*—When employees are required to perform work under hovering craft a safe means of access shall be provided for employees to reach the hoist line hook and engage or disengage cargo slings. Employees shall not be permitted to perform work under hovering craft except when necessary to hook or unhook loads.

(j) *Static charge.*—Static charge on the suspended load shall be dissipated with a grounding device before ground personnel touch the suspended load, or protective rubber gloves shall be required to be worn by all ground personnel touching the suspended load.

(k) *Weight limitation.*—The weight of an external load shall not exceed the manufacturer's rating.

(l) *Ground lines.*—Hoist wires or other gear, except for pulling lines or conductors that are allowed to "pay out" from a container or roll off a reel, shall not be attached to any fixed ground structure, or allowed to foul on any fixed structure.

(m) *Visibility.*—When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and stabilizing rotors. Precautions shall also be taken by the employer to eliminate, as far as practical, the dust or other conditions reducing the visibility.

(n) *Signal systems.*—Signal systems between aircrew and ground personnel shall be understood and checked in advance of hoisting the load. This applies to either radio or hand signal systems. Hand signals shall be as shown in Figure N–1.

(o) *Approach distance.*—No unauthorized person shall be allowed to approach within 50 feet of the helicopter when the rotor blades are turning.

(p) *Approaching helicopter.*—Whenever approaching or leaving a helicopter with blades rotating, all employees shall remain in full view of the pilot and keep in a crouched position. Employees shall avoid the area from the cockpit or cabin rearward unless authorized by the helicopter operator to work there.

(q) *Personnel.*—Sufficient ground personnel shall be provided when required for safe helicopter loading and unloading operations.

(r) *Communications.*—There shall be constant reliable communication between the pilot and a designated employee of the ground crew who acts as a signal man during the period of loading and unloading. This signalman shall be distinctly recognizable from other ground personnel.

(s) *Fires.*—Open fires shall not be permitted in an area that could result in such fires being spread by the rotor downwash.

(Sec. 6, Pub. L. 91–596, 84 Stat. 1593 (29 U.S.C. 655))

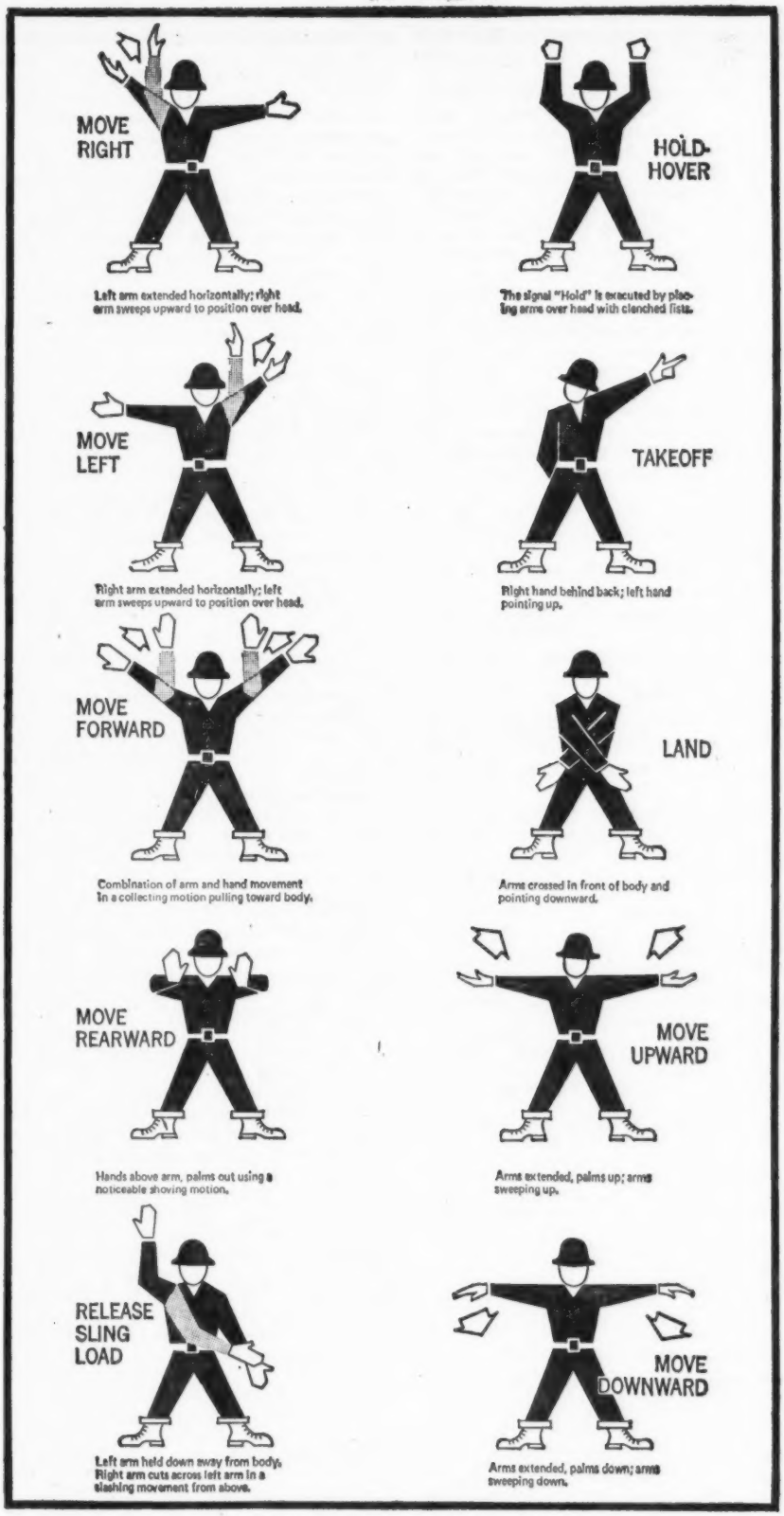
MOVE RIGHT
Left arm extended horizontally; right arm sweeps upward to position over head.
HOLD-HOVER
The signal "Hold" is executed by placing arms over head with clenched fists.
MOVE LEFT
Right arm extended horizontally; left arm sweeps upward to position over head.
TAKEOFF
Right hand behind back; left hand pointing up.
MOVE FORWARD
Combination of arm and hand movement in a collecting motion pulling toward body.
LAND
Arms crossed in front of body and pointing downward.
MOVE REARWARD
Hands above arm, palms out using a noticeable shoving motion.
MOVE UPWARD
Arms extended, palms up; arms sweeping up.
RELEASE SLING LOAD
Left arm held down away from body. Right arm cuts across left arm in a slashing movement from above.
MOVE DOWNWARD
Arms extended, palms down; arms sweeping down.

FIGURE N-1 HELICOPTER HAND SIGNAL

2. Paragraph (b) would be revised and a new paragraph (c) would be added to § 1910.67 to read as follows:

§ 1910.67 Vehicle-mounted elevating and rotating platforms.

* * * * *

(b) *General Requirements.*—(1) Unless otherwise provided in this section aerial devices (aerial lifts) acquired for use on or after [the effective date of this provision will be inserted here] must have been designed and constructed in conformance with the applicable requirements of the American National Standard for "Vehicle Mounted Elevating and Rotating Work Platforms," (ANSI) ANSI A92.2–1969, including appendix. Aerial lifts acquired before the effective date, which do not meet the requirements of ANSI A92.2–1969, may not be used after January 1, 1976, unless they shall have been modified so as to conform with the applicable design and construction requirements of ANSI A92.2–1969. Aerial devices includes the following types of vehicle-mounted devices used to elevate personnel to jobsites above ground: (i) Extensible boom platforms, (ii) aerial ladders, (iii) articulating boom platforms, (iv) vertical towers, and (v) a combination of any of the above. Aerial equipment may be made of metal, wood, fiberglass reinforced plastic (FRP), or other material, may be powered or manually operated; and are deemed to be aerial lifts whether or not they are capable of rotating about a substantially vertical axis.

(2) Aerial lifts may be "field modified" for uses other than those intended by the manufacturer provided the modification has been certified in writing by the manufacturer or by any other equivalent entity, such as a nationally recognized testing laboratory, to be in conformity with all applicable provisions of ANSI A92.2–1969 and this section and to be at least as safe as the equipment was before modification.

(3) The requirements of this section do not include any matter relating to firefighting equipment or any matter relating to the vehicles upon which aerial devices are mounted, except in respect to a vehicle being a stable support for the aerial device.

(4) Operating near electric power lines. (i) Except where the electrical distribution and transmission lines have been deenergized and visibly grounded at point of work or where insulating barriers not a part of or an attachment to the aerial lift have been erected to prevent physical contact with the lines, aerial lifts shall be operated proximate to, under, over, by, or near powerlines only in accordance with the following:

(A) For lines rated 50 kv. or below, minimum clearance between the lines and any part of the aerial lift shall be 10 feet.

(B) For lines rated over 50 kv., minimum clearance between the lines and any part of the aerial lift shall be 10 feet plus 0.4 inch for each 1 kv. over 50

kv., or shall be twice the length of the line insulator, but never less than 10 feet.

(ii) Proximity warning devices may be used on aerial lifts, but the use of such devices shall not operate to alter the requirements of subdivision (i) of this subparagraph.

(iii) Before the commencement of operations near electrical lines, the owners of the lines or their authorized representatives shall be notified and provided with all pertinent information. The owner's cooperation shall be requested.

(iv) Any overhead wire shall be considered to be an energized line until the owner of the line or their authorized representative state that it is deenergized.

(c) *Specific requirements.* (1) *Ladder trucks and tower trucks.*—Aerial ladders shall be secured in the lower traveling position by the locking device on top of the truck cab, and the manually operated device at the base of the ladder before the truck is moved for highway travel.

(2) *Extensible and articulating boom platforms.*—(i) Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.

(ii) Only authorized persons shall operate an aerial lift.

(iii) Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.

(iv) Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

(v) A body belt shall be worn and lanyard attached to the boom or basket when working from an aerial lift.

(vi) Boom and basket load limits specified by the manufacturer shall not be exceeded.

(vii) The brakes shall be set and when outriggers are used, they shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline.

(viii) An aerial lift truck shall not be moved when the boom is elevated in a working position with men in the basket, except for equipment which is specifically designed for this type of operation in accordance with the provisions of subparagraphs (1) and (2) of paragraph (b) of this section.

(ix) Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

(x) Climbers shall not be worn while performing work from an aerial lift.

(xi) The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.

(xii) Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position except as provided in subdivision (viii) of this subparagraph.

(3) *Electrical tests.*—All electrical tests shall conform to the requirements of ANSI A92.2–1969, Section 5. However, equivalent DC voltage tests may be used in lieu of the AC voltage specified in A92.2–1969. DC voltage tests which are approved by the equipment manufacturer or equivalent entity shall be considered an equivalent test for the purpose of this subparagraph (3).

(4) *Bursting safety factor.*—The provisions of the American National Standards Institute standard ANSI A92.2–1969, Section 4.9 Bursting Safety Factor, shall apply to all critical hydraulic and pneumatic components. Critical components are those in which a failure would result in a free fall or free rotation of the boom. All noncritical components shall have a bursting safety factor of at least two to one.

(5) *Welding standards.*—All welding shall conform to the following standards as applicable:

(i) Standard Qualification Procedure, AWS B3.0–41.

(ii) Recommended Practices for Automotive Welding Design, AWS D8.4–61.

(iii) Standard Qualification of Welding Procedures and Welders for Piping and Tubing, AWS D10.9–69.

(iv) Specifications for Welding Highway and Railway Bridges, AWS D2.0–69.

(Sec. 6, Pub. L. 91–596, 84 Stat. 1593 (29 U.S.C. 655))

3. A new Subpart T—"Telecommunications" would be added to Part 1910 to read as follows:

Subpart T—Telecommunications

Sec.
1910.330 Application.
1910.331 General.
1910.332 Training.
1910.333 Employee Protection in Public Work Areas.
1910.334 Tools and Personal Protective Equipment.
1910.335 Rubber Insulating Equipment.
1910.336 Personal Climbing Equipment.
1910.337 Ladders.
1910.338 Other Tools and Personal Protective Equipment.
1910.339 Vehicle-mounted Material Handling Devices and other Mechanical Equipment.
1910.340 Materials Handling and Storage.
1910.341 Cable Fault Locating and Testing.
1910.342 Grounding for Employee Protection—Pole Lines.
1910.343 Overhead Lines.
1910.344 Underground Lines.
1910.345 Microwave Transmission.
1910.346 Tree Trimming—Electrical Hazards.
1910.347 Definitions.
1910.348 Standards Organizations.

AUTHORITY: Sec. 6, Pub. L. 91–596, 84 Stat. 1593 (29 U.S.C. 655).

§ 1910.330 Application.

(a) This Subpart sets forth Safety and Health Standards that apply to the conditions, practices, means, methods, operations, installations and processes performed at telecommunications centers and telecommunications field work, when performed under the control of employers providing telecommunications services located outdoors or in building spaces used for such field installations. "Field" work includes installations, operation, maintenance, rearrangement, and removal of conductors and other equipment used for signal or communication service, and of their supporting or containing structures, overhead or underground, on public or private rights of way, including buildings or other structures. "Center" work includes installation, operation, maintenance, rearrangement, and removal of communications equipment and other associated equipment in telecommunications switching centers.

(b) These standards do not apply to construction work, as this phrase is defined in § 1910.12; nor to installations under the exclusive control of electric utilities for the purpose of communications or metering, or for generation, control, transformation, transmission, and distribution of electric energy, located in buildings used exclusively by the utilities for such purposes, or located outdoors on property owned or leased by the utilities or on public highways, streets, roads, etc., or outdoors by established rights on private property.

(c) Operations or conditions not specifically covered by this Subpart T are subject to applicable general standards in Subpart D through Q and S of this Part 1910, see § 1910.5(c). The fact that attention is directed in several provisions of this Subpart to the application of sections of other Subparts of this Part 1910 to facilitate their use is not intended to detract from the applicability of any other general standard dealing with matters not covered by this Subpart T.

§ 1910.331 General.

(a) *Buildings containing telecommunications centers.* (1) *Electrical plans.*—Buildings which contain telecommunications centers shall be constructed and equipped in accordance with engineering plans whose electrical specifications for the building power and light shall conform to § 1910.309.

(2) *Illumination.*—Lighting in telecommunication centers shall be provided such that continuing work operations, routine observations, and the passage of employees can be carried out in a safe and healthful manner. Certain specific tasks in centers such as splicing cable and the maintenance and repair of equipment frame lineups may require a higher level of illumination while they are being performed. In such cases, where it is not reasonable to install permanent lighting of that higher level, portable supplemental lighting to attain that higher level shall be provided as needed to safely perform the required task.

(3) *Working surfaces.*—Guard rails and toe boards on distribution frame mezzanine platforms may be omitted to permit access to equipment only on the side facing the frame where the frame is equipped. The general provisions of § 1910.23 shall also be applicable to working surfaces.

(4) *Working spaces.*—"Maintenance aisles," or "wiring aisles," between equipment frame lineups are considered to be working spaces and are not a means of egress as defined in § 1910.35(a).

(5) *Special doors.*—Where provided, blastproof doors and power operated doors in special purpose buildings or spaces shall be installed in accordance with the building plans. However, doors shall be so designed and installed that they will not impede or prevent emergency use of the exit.

(6) *Equipment, machinery and machine guarding.*—Power plant machinery in telecommunications centers may be operated with commutators and couplings uncovered, provided the adjacent housing is clearly marked to alert personnel to the rotating machinery.

(b) *Battery rooms.*—(1) Employees taking battery readings or handling electrolyte shall wear eye protection devices which provide side as well as frontal eye protection. Acid resistant gloves and aprons shall be worn for protection against spattering. Facilities for quick drenching or flushing of the eyes and body shall be provided in battery rooms unless the storage batteries are of the enclosed type (equipped with explosion proof vents) in which case sealed water rinse or neutralizing packs shall be provided. Employees assigned to work with storage batteries shall be instructed in emergency procedures such as coping with accidental acid spills, as well as routine operations.

(2) Electrolyte (acid and distilled water) or sodium hydroxide for battery cells shall be mixed in a well ventilated room. Acid or sodium hydroxide shall be poured gradually while stirring into the water. Water shall never be poured into concentrated (greater than 75 percent) acid solutions. Electrolyte shall never be placed in metal containers nor stirred with metal objects.

(3) When taking specific gravity readings, an acid resistant gloved finger shall be placed over the end of the hydrometer while moving it from cell to cell to avoid splashing or throwing the electrolyte.

(c) *Medical and first aid.*—First aid supplies recommended by a consulting physician shall be placed in weatherproof containers (unless stored indoors) and shall be easily accessible. Expended items shall be replaced.

(d) *Hazardous materials.*—Highway mobile vehicles and trailers stored in garages in accordance with Section 1910.110 may be equipped to carry more than one LP-gas container, but the total capacity of LP-gas containers per work vehicle stored in garages shall not exceed 100 pounds LP-gas. All container valves shall be closed when not in use.

(e) *Compressed gas.*—Nitrogen cylinders may be transported and used in a horizontal position only if special compartments, racks, or adequate blocking to prevent cylinder movement is provided.

(f) *Support structures.*—No employee or any material or equipment shall be supported or permitted to be supported on any portion of a pole structure, platform, ladder, walkway or other elevated structure or aerial device without its first being inspected, determined to be adequately strong, in good condition and properly secured in place.

(g) *Approach distances.*—No employees shall be permitted to approach or take any conductive object closer to any electrically energized parts than prescribed in Table T–1, unless:

(1) The employee is insulated or guarded from the energized parts (insulating gloves rated for the voltage involved shall be considered adequate insulation), or

(2) The energized parts are insulated or guarded from the employee and any other conductive object at a different potential, or

(3) The power conductors and equipment are deenergized and grounded.

TABLE T–1.—APPROACH DISTANCES TO EXPOSED ENERGIZED POWER CONDUCTORS

Voltage Range (nominal, phase to phase):	*Distance Avoid Contact*
300 v and less	12 in.
Over 300, not over 750 v	18 in.
Over 750 v, not over 2 kv	24 in.
Over 2 kv, not over 15 kv	36 in.
Over 15 kv, not over 37 kv	42 in.
Over 37 kv, not over 87.5 kv	48 in.
Over 87.5 kv, not over 121 kv	54 in.
Over 121 kv, not over 140 kv	

(h) When working closer than 6" from exposed energized power conductors the employee shall wear head protection, insulating gloves and safety glasses.

§ 1910.332 Training.

(a) Employees may not be allowed by any employer to engage in the activities to which this Subpart applies until they have received training pursuant to an established written training program in precautions they may be required to take in accordance with this Subpart. In addition, such training shall, where appropriate, include the subjects of avoidance of harmful substances and dangers relating to encounters with animal or plant life and procedures for use in emergency situations. First-aid training which includes artificial respiration shall also be provided.

§ 1910.333 Employee Protection in Public Work Areas.

(a) Before engaging in work in the vicinity of vehicular or pedestrian traffic which may endanger employees, warning signs and/or flags or other traffic control devices shall be placed conspicuously to alert and channel approaching traffic. Where further protection is needed, barriers shall be utilized. At night warning lights shall be prominently displayed and excavations shall be enclosed with protective barricades.

(b) If work exposes energized or moving parts that are normally protected, danger signs shall be displayed and a barricade erected, as necessary, to warn other personnel in the area.

(c) An employee finding any crossed or fallen wires at the work area which create or may create a hazard shall remain on guard or adopt other adequate means to warn other employees of the danger and shall have the proper authority notified at the earliest practical moment.

§ 1910.334 Tools and Personal Protective Equipment. Generally.

Employees shall be required to use the personal protective equipment, the protective devices, and the special tools required for their work. Before use, these devices and tools shall be carefully checked by the employee to make sure that they are in good condition.

§ 1910.335 Rubber Insulating Equipment.

(a) Rubber insulating equipment designed for the voltage levels to be encountered shall be used as required in other Sections of this Subpart. This equipment shall meet the electrical and physical properties requirements contained in ANSI J6.6–1971 and ANSI J6.4–1971 with the exception that a modified (thinner) Class I glove is permitted in telecommunications operations. This "Modified Class I" glove shall meet the following electrical test voltages.

Class of glove	3 minimum proof test voltage-RMS volts	Maximum proof-test current, ma 14-in. glove	Minimum breakdown voltage, RMS volts
Modified Class I	10,000	16	17,000

(b) When these gloves are being used on jobs where they are likely to be torn, they shall be protected with heavy outer canvas or leather gloves, and in pole placing or removal operations, pole insulating devices shall be used in accordance with § 1910.343(k).

(c) Multi-ply construction with contrasting colors may be used with insulating gloves to aid in detecting cuts, cracks, and deep abrasions.

(d) Protective equipment fabricated of material other than rubber shall provide equal or better electrical and mechanical protection.

(e) The employer is responsible for periodic retest of insulating gloves and blankets. This retest shall be electrical, visual and mechanical. The following maximum retest intervals shall apply:

	Natural rubber	Synthetic rubber
New Gloves	12 months	18 months.
Re-issued Gloves	9 months	15 months.
New Blankets	12 months	18 months.
Re-issued Blankets	9 months	15 months.

(f) Gloves and blankets shall be marked in some manner to indicate compliance with the retest schedule. They shall be legibly stamped with the date the next test is due. Gloves found to be

defective in the field or by electrical test shall be destroyed by cutting open from the finger to the gauntlet.

(g) When not being used, insulating gloves shall be stored in glove bags or their original containers to minimize chances for damage. Insulating blankets shall be stored in a canister or other device which offers equivalent protection.

(h) Insulating gloves and blankets shall be stored away from the direct sunlight, steam pipes, radiators and other excessive heat. Gloves and blankets shall not be folded while in storage, however blankets may be rolled for storage.

§ 1910.336 Personal Climbing Equipment.

(a) No safety belts, safety straps or pole climbers acquired after [effective date of this subpart] shall be used unless they meet the requirements set forth in this section. Safety belts and straps shall be used by employees to protect them in working positions at elevated locations (more than 4 feet above ground) on poles, towers or other outside structures (excluding portable ladders) as discussed further in § 1910.343, *Overhead Lines*. Safety belts and straps shall be checked at least semiannually by the employer to determine that they are in safe working condition.

(b) *Telecommunication lineman's body belts, safety straps, and lanyards.*—(1) *General requirements.*—Hardware for lineman's body belts, safety straps, and lanyards shall be drop forged or pressed steel and have a corrosive resistive finish tested to American Society for Testing and Materials B117–64 (50-hour test). Surfaces shall be smooth and free of sharp edges. Lineman's safety straps, body belts and lanyards shall be approved by a nationally recognized testing laboratory as having been tested in accordance with the requirements of this section.

(2) All buckles shall withstand a 2,000-pound tensile test with a maximum permanent deformation no greater than one sixty-forth inch.

(3) D rings shall withstand a 5,000-pound tensile test without failure. Failure of a D ring shall be considered cracking or breaking.

(4) Snaphooks shall withstand a 5,000-pound tensile test without failure, or a 3,000-pound tensile test and a bend test. Tensile failure of a snaphook shall be distortion sufficient to release the keeper. Failure of the bend test shall be cracking of the snaphook.

(c) *Specific requirements.*—(1) (i) All fabric used for safety straps shall be capable of withstanding an A.C. dielectric test of not less than 25,000 volts per foot "dry" for 3 minutes, without visible deterioration.

(ii) All fabric and leather used shall be tested for leakage current which shall not exceed 1 milliampere when a potential of 3,000 volts is applied to the electrodes positioned 12 inches apart.

(iii) Direct current tests may be permitted in lieu of alternating current tests.

(2) The cushion part of the body belt shall:

(i) Contain no exposed rivets on the inside. This provision shall not apply to belts used by craftsman not engaged in line work.

(ii) Be at least three (3) inches in width;

(iii) Be at least five thirty-seconds (5/32) inch thick, if made of leather and and

(iv) Have pocket tabs that extended at least 1½ inches down and three (3) inches back of the inside of the circle of each D ring for riveting on plier or tool pockets. On shifting D belts, this measurement for pocket tabs shall be taken when the D ring section is centered.

(3) A maximum of four (4) tool loops shall be situated on the body belt.

(4) Suitable copper, steel, or equivalent liners shall be used around the bar of D rings to prevent wear between these members and the leather or fabric enclosing them.

(5) All stitching shall be a minimum 42-pound weight nylon or equivalent thread and shall be lock stitched. Stiching parallel to an edge shall not be less than three-sixteenths (3/16) inch from edge of narrowest member caught by the thread. The use of cross stitching on leather is prohibited.

(6) The keeper of snaphooks shall have a spring tension that will not allow the keeper to begin to open with a weight of 2½ pounds or less, but the keeper of snaphooks shall begin to open with a weight of four (4) pounds, when the weight is supported on the keeper against the end of the nose.

(7) Safety straps and lanyards shall be tested in accordance with the following procedure:

(i) Attach one end of the safety strap or lanyard to a rigid support, the other end shall be attached to a 250-pound canvas bag of sand:

(ii) Allow the 250-pound canvas bag of sand to free fall 4 feet for (safety strap test) and 6 feet for (lanyard test) in each case stopping the fall of the 250-pound bag:

(iii) Failure of the strap or lanyard shall be indicated by any breakage or slippage sufficient to permit the bag to fall free of the strap or lanyard. The entire "body belt assembly" shall be tested using one D ring. A safety strap or lanyard shall be used that is capable of passing the "impact loading test" as described in subdivision (ii) and attached as required in subdivision (i) of this subparagraph. The body belt shall be secured to the 250-pound bag of sand at a point to simulate the waist of a man and allowed to drop as stated in subdivision (ii) of this subparagraph. Failure of the body belt shall be indicated by any breakage, or slippage sufficient to permit the bag to fall free of the body belt.

(d) *Pole climbers.*—(1) Pole climbers shall not be used after the gaffs are worn to less than 1¼ inches long as measured on the underside of the gaff.

(2) Pole climbers shall be inspected for the following conditions; fractured or cracked gaffs or leg irons, loose or dull gaffs, broken straps or buckles. If found, these conditions shall be corrected before the climbers are used.

(3) Pole climbers shall be inspected before each use and tested at least weekly when in use. The employer shall make at least a semiannual inspection of all climbers in active use in their operations.

(4) Pole climbers shall not be worn when:

(i) Working in trees, however specifically designed tree climbers shall be used for tree climbing.

(ii) Working on ladders.

(iii) working in an aerial lift.

(iv) driving a vehicle.

(v) walking on rocky, brushy or hilly terrain.

§ 1910.337 Ladders.

(a) No employee or any material or equipment, shall be supported or permitted to be supported on any portion of a ladder without its first being determined, by inspections and checks that such a ladder is adequately strong, in good condition, and properly secured in place.

(b) The spacing of steps or rungs permanently installed on poles and towers and fixed ladders on towers when so equipped, shall be no more than 18 inches (36 inches on any given side) and steps shall be uniform above the initial unstepped section except where working, standing or access steps are required. Fixed ladder rungs and step rungs for poles and towers shall have a minimum diameter of ⅝". Fixed ladder rungs shall have a minimum clear width of 12 inches. Steps for poles and towers shall have a minimum clear width of 4½ inches. Spacing of detachable steps shall not exceed 30 inches and steps shall be properly secured when in use.

(c) Portable wood ladders intended for general use shall not be painted but may be coated with a translucent nonconductive coating. They shall not be longitudinally reinforced with metal.

(d) Portable wood ladders that are not being carried on vehicles and are not being used for extended periods shall be stored where they will not be exposed to the elements but where there is good ventilation. Ladders shall not be stored near radiators, stoves, steampipes or in places where the wood may be subjected to excessive heat or dampness.

(e) Rolling ladders used in telephone Communication Centers shall have a minimum width between the side rails, inside of at least eight inches.

(f) Climbing ladders or stairways on scaffolds may be used for access and egress, if affixed or built into the scaffold by proper design and engineering, and located so that its use will not disturb the stability of the scaffold. The rungs of the climbing device shall be equally spaced, but not less than 12 inches nominal or more than 16 inches nominal. Horizontal end rungs used for platform supports may also be used as

the climbing device if they are spaced as provided above, and provided that there is sufficient clearance between the rung and the edge of the platform to afford an adequate handhold. In lieu of these requirements a portable ladder with rungs equally spaced as above may be securely attached to the scaffold. A clearance in the back of the ladder of not less than 6 inches from center of rung to the nearest scaffold structural member shall be provided.

(g) When a ladder is supported by aerial strand and ladder hooks or other supports are not being used the ladder shall be at least 2 feet above the strand and be secured to it (e.g. lashed or held by safety strap around strand and ladder side rail).

(h) *Metal manhole ladders.*—(1) Except as provided herein specific design and construction requirements are not contained in this section because of the wide variety of metals and design possibilities. However, the design shall be such as to produce a ladder without structural defects or accident hazards such as sharp edges and burrs. The metal selected shall be protected against corrosion unless inherently corrosion-resistant.

(2) Because of the varied conditions, and the wide variety of ladder uses, ladders may be designed with parallel side rails, with side rails varying uniformly in separation along the length (tapered), or with side rails flaring at the base to increase stability.

(3) The spacing of rungs or steps shall be on 12-inch centers.

(4) Rungs or steps to side rail connections shall be so constructed as to insure rigidity as well as strength.

(5) Rungs and steps shall be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the possibility of slipping.

(6) Hardware shall meet strength requirements of the ladder's component parts, and shall be of a material that is protected against corrosion unless inherently corrosion-resistant. Metals shall be so selected as to avoid excessive galvanic action.

§ 1910.338 Other Tools and Personal Protective Equipment.

(a) *Head protection.*—Helmets for the protection of heads of employees exposed to possible head injury from impact, or from falling or flying objects or exposed to high voltage electrical contact shall be worn and meet the requirements of ANSI Standard Z89.2–1971 (Class B).

(b) *Eye protection.*—Eye protection shall meet the requirement prescribed in § 1910.133 of this part. Eye protection shall be used where foreign objects may enter the eyes due to work operations such as but not limited to:

(1) Drilling or chipping stone, brick or masonry, breaking concrete or pavement, etc., by hand tools (sledgehammer, etc.) or power tools such as pneumatic drill or hammer.

(2) Working on or around high speed emery or other grinding wheels unprotected by guards.

(3) Cutting or chipping terra cotta ducts, tile, etc.

(4) Working under motor vehicles requiring hammering.

(5) Cleaning operations using compressed air, steam, or sand blast.

(6) Acetylene welding or similar operations where sparks are thrown off.

(7) Using powder actuated stud drivers.

(8) Tree pruning or cutting underbrush.

(9) Handling battery cells and solutions such as taking battery readings with a hydrometer and thermometer.

(10) Removing or rearranging strand or open wire.

(11) While performing lead sleeve opening and closing as covered in § 1910.338(1) of this part.

(c) *Hearing protection.*—The provisions of § 1910.95 shall apply.

(d) *LP-gas.*—LP-gas used at work locations shall be transported in DOT approved cylinders and marked in accordance with § 1910.110(c)(2) of this part. NOTE: Section 1910.110(b)(5) does not apply to these cylinders.

(e) *Tent heaters.*—Unless aerial or ground tent covers are constructed of fire resistant material and adequate ventilation is provided, heaters used on platforms and within tents at outdoor locations require an automatic fuel shutoff device.

(f) *Torches.*—Torches may be used on aerial splicing platforms or buckets enclosed by tents provided the tent material is constructed of fire resistant material and torch is turned off when not in actual use. Aerial tents shall be ventilated while the torch is in operation.

(g) *Portable power equipment.*—Nominal 120V, or less, portable generators for providing power at work locations do not require grounding provided the output circuit is completely isolated from the frame of the unit.

(h) *Vehicle-mounted utility generators.*—Vehicle-mounted utility generators for providing nominal 240V AC or less for powering portable tools and equipment need not be grounded to earth provided all of the following conditions met:

(1) One side of the voltage source is solidly strapped to the metallic structure of the vehicle;

(2) Use grounding-type outlets, with a "grounding" conductor between the outlet grounding terminal and the side of the voltage source that is strapped to the vehicle;

(3) All metallic encased tools and equipment that are powered from this system shall be equipped with three-wire cords and plugs, except as designated in § 1910.338 (i) and (j) of this part.

(i) *Portable lights, tools, and appliances.*—Portable lights, tools, and appliances having noncurrent carrying external metal housing may be used with power equipment described in paragraph (g) without the need for a grounding conductor. When operated from commercial power such metal parts of these devices shall be grounded, except as provided in paragraph (j) of this section.

(j) *Portable tools and appliances.*—Portable tools and appliances which are protected by a system of double insulation, or its equivalent, need not be grounded. Where such a system is employed, the equipment shall be distinctively marked.

(k) *Soldering devices.*—Grounding shall be omitted when using soldering irons, guns or power wire-wrap tools on telecommunications circuits.

(l) *Lead work.*—The wiping or unwiping of lead joints using melted solder gas fueled torches, soldering irons or other appropriate heating devices and the soldering of wires or other electrical connections does not constitute welding, cutting, and brazing as covered in Subpart Q of Part 1910. Electric solder pots may be used with power equipment described in (g) without the need for a grounding conductor. When operated from commercial power the metal housing of such pots must be grounded. Eye protection shall be provided by the employer and worn at all times while lead wiping, unwiping, and soldering are being performed. Wiping gloves shall be provided and used in lead wiping or unwiping. A drip pan to catch hot lead dripping shall also be provided and used.

§ 1910.339 Vehicle-mounted Material Handling Devices and other Mechanical Equipment.

(a) *General.* (1) Visual inspections shall be required to be made of the equipment to insure it is in good condition each day the equipment is to be used.

(2) Tests shall be made at the beginning of each shift to insure the vehicle brakes and operating systems are in proper working condition.

(b) *Scrapers, loaders, dozers, graders, and tractors.*—(1) All rubber-tired, self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, agricultural and industrial tractors, crawler tractors, crawler-type loaders, and motor graders, with or without attachments, that are used in telecommunications work shall have rollover protective structures in accordance with Subpart W of Part 1926.

(2) Operators shall wear eye protection when working in areas where flying material is generated.

(c) *Vehicle mounted elevating and rotating work platforms.*—This equipment shall conform to § 1910.67 of this part. These devices shall not be operated with any conductive part of the equipment closer to exposed energized power lines than the clearances set forth in Table T–1 of § 1910.331(g).

(d) *Derrick trucks and similar equipment.*—(1) This equipment shall not be operated closer to energized parts than permitted in § 1910.331(g) of this part;

(2) When derricks are used to handle poles near energized power conductors, these operations shall comply with § 1910.343(k) and § 1910.331(g) of this part;

(3) Moving parts of telecommunication line trucks may be protected with barricades as specified in § 1910.333(b) of this part;

(4) Derrick requirements. (i) Manufacturer's specifications, load ratings and instructions for derrick operation shall be strictly observed.

(ii) Rated load capacities and instructions related to derrick operation shall be conspicuously posted on a permanent weather-resistant plate or decal in a location that is plainly visible to the derrick operator.

(iii) Prior to derrick operation the parking brake must be set and the stabilizers extended if the vehicle is so equipped. When the vehicle is situated on a grade, the wheels must be chocked on the downgrade side of the rear wheels.

(iv) Only persons trained in the operation of the derrick shall be permitted to operate the derrick.

(v) All hand signals employed between the operator and other persons directing the work operation shall be thoroughly understood by all persons concerned.

(vi) The derrick and associated equipment shall be inspected at intervals designated by the manufacturer and employer but in no case less than once per year. Records shall be maintained denoting the dates of inspection and necessary repairs made if corrective action is required.

(vii) Modifications or additions to the derrick and associated equipment that alter the capacity or affect its safe operation shall be made only with written certification from the manufacturer, or other equivalent entity such as a nationally recognized testing laboratory. Such changes shall require the changing and posting of revised capacity and instruction decals or plates, the new ratings or limitations being provided by the manufacturer or other equivalent entity. The certification shall state that the modification results in the equipment being as safe as the equipment was before modification.

(viii) Wire rope associated with derricks shall be of improved plow steel grade or equivalent and shall have a maximum rated working load of not more than one-half the published breaking strength of the wire rope.

(ix) Wire rope shall be taken out of service or the effected portion removed when any of the following conditions exist; (A) The rope strength has been significantly reduced due to corrosion, pitting, or excessive heat, or

(B) The thickness of the outer wires of the rope has been reduced by wear to one-half or more of the original thickness, or

(C) There are more than nine broken wires in any one rope lay, or

(D) There is excessive permanent distortion caused by kinking, crushing, or severe twisting of the rope.

(x) Telecommunications derricks are defined in this section as a rotating or nonrotating derrick structure having a working capacity of 2,000 pounds or greater, mounted on a vehicle for the purpose of lifting, lowering the positioning hardware and materials used in telecommunications work.

§ 1910.340 Materials Handling and Storage.

(a) *Poles.*—When working with poles in piles or stacks, employees shall work from the ends of the poles as much as possible, and shall be alert for a man at the other end of the pole. During pole hauling operations, all loads shall be secured to prevent displacement, and lights, reflector and/or flags shall be displayed on the end and sides of the load as necessary. The installation, removal, or other handling of poles in pole lines is governed by § 1910.343 of this part for Overhead Lines. In the case of hoisting machinery equipped with a positive stop load-holding device it shall be permissible for the operator to leave his position at the controls while a load is suspended for the purpose of assisting in positioning the load prior to landing it. Prior to unloading steel, poles, crossarms and similar material the load shall be thoroughly examined to ascertain that the load has not shifted, that binders or stakes have not broken or that the load is not otherwise hazardous to employees.

(b) *Cable reels.*—Cable reels in storage shall be chocked or otherwise restrained when there is a possibility they might accidentally roll from position.

§ 1910.341 Cable Fault Locating and Testing.

When high voltages are used in locating trouble or testing a cable the employer shall instruct the employees involved in steps to be taken for their own and other employee's safety. These include isolating the cable conductors to the extent practical and warning employees, by such techniques as briefing and tagging at all affected locations, to stay clear while the voltage is applied.

§ 1910.342 Grounding for Employee Protection—Pole Lines.

(a) Electric power conductors and equipment shall be treated as energized unless it can be seen that they are bonded to one of the grounds listed in paragraph (e) of this section.

(b) *Nonworking open wire.*—Nonworking open wire communications lines shall be bonded to one of the grounds listed in paragraph (e) of this section.

(c) *Vertical power conduit, power ground wires and street light fixtures.*—(1) Metal power conduit on joint use poles, exposed vertical power ground wires, and street light fixtures which are below communications attachments or less than 20 inches above shall be considered energized and tested for voltage unless it can be seen that they are bonded to the communications suspension strand or cable sheath.

(2) If no hazardous voltage is shown by the voltage test, a temporary bond shall be placed between such street light fixture, exposed vertical power grounding conductor, or metallic power conduit and the communications cable strand. Temporary bonds used for this purpose shall have sufficient conductivity to carry at least 500 amperes for a period of one second without fusing.

(d) *Line installation.*—Installation of telecommunication suspension strands can be considered as deenergized where no energized power conductors are present and no thunderstorm activity is evident.

(e) *Suitable grounds for protective grounding.*—Suitable grounds for protective grounding are as follows:

(1) A vertical ground wire which has been tested, found safe, and is connected to a power system multigrounded neutral or the grounded neutral of a power secondary system where there are at least three services connected.

(2) Communications cable sheath or shield and its supporting strand where the sheath or shield is:

(i) Bonded to underground or buried cable which is connected to a central office ground or,

(ii) Bonded to an underground metallic piping system or,

(iii) Bonded to a power system multigrounded neutral or grounded neutral of power secondary system which has at least three services connected.

(3) Guys which are bonded to (1) or (2) above, and whose continuity is not interrupted by an insulator.

(4) In the absence of any of the preceding grounds, arrays of driven ground rods may be used where the resultant resistance to ground will be less than 25 ohms.

(f) *Attaching and removing temporary bonds.*—When attaching grounds (bonds), the first attachment shall be made to the protective ground. The bond shall be attached while wearing insulating gloves. When removing bonds, the connection to the line or equipment shall be removed first. Insulating gloves shall be worn during this operation.

(g) *Temporary grounding of suspension strand.*—(1) Suspension strand shall be grounded to existing grounds listed in paragraph (e) preceding when being placed

(i) On jointly used poles or

(ii) During thunderstorm activity. Intervals between such grounds need not be closer than ¼ mile.

(2) Where power crossings are encountered on nonjoint lines, the strand shall be bonded to an existing ground (see paragraph (e) of this section) as close as possible to the crossing. This is not required where crossings are made on a common crossing pole unless there is an upward change in grade at the pole.

(3) Where roller type bonds are used, they shall be restrained so as to avoid stressing the electrical connections.

(4) Bonds between the suspension strand and the existing ground shall be at least #6AWG copper.

(5) Temporary bonds shall be left in place until the strand has been tensioned, dead ended, and permanently grounded.

(6) The preceding paragraphs (1 through 5) do not apply to the installation of insulated strand.

(h) Antenna work—radio transmitting stations (3–30 MHZ).—(1) Prior to

grounding a radio transmitting station antenna, the rigger in charge shall:

(i) Prepare a danger tag signed with his signature,

(ii) Contact the transmitting technician regarding the transmitter shutdown and the grounding of the antenna with its grounding switch.

(iii) be notified by the transmitting technician that the transmitter has been shutdown. After the antenna has been grounded by the transmitting technician, the rigger shall tag the antenna ground switch personally in the presence of the transmitting technician. Power shall not be applied to the antenna, or the ground switch opened under any circumstance while tag is on. Where no ground switches are provided, ground sticks shall be used, one each side of line, and the tag put on the ground sticks, antenna switch, or plate power switch, in a conspicuous place. In certain cases, ground sticks or short circuits may be needed directly on the transmission lines near the transmitter in addition to the regular ground switches in order to reduce excessive radio frequency pickup. In other cases it may reduce pickup at the point in the field if the antenna lines are disconnected from ground and the transmitter.

(2) Riggers shall test all radio frequency line wires for pickup with an insulated probe before handling with bare hands or metal tools.

(3) Transmitting technicians shall warn the riggers of adjacent lines which are, or may become energized.

(4) When antenna work has been completed, the rigger in charge of the job shall return to the transmitter, notify the transmitting technician in charge and personally remove the tag.

§ 1910.343 Overhead Lines.

(a) *Handling suspension strand.*—(1) Persons handling cable suspension strand being installed on poles carrying exposed energized power conductors shall wear insulating gloves and avoid body contact with the strand until after it has been tensioned, deadened, and permanently grounded.

(2) Strand shall be restrained against upward movement during installation where there is an upward change in grade on joint-use poles, and on nonjoint poles where the line crosses under energized power conductors.

(b) *Need for testing wood poles.*—Unless temporary guys or braces are attached first, poles shall be tested before climbing where one or more of the following conditions exist:

(1) At deadend poles (does not include properly braced or guyed "Y" or "T" cable junction poles).

(2) Straight line poles which are not storm guyed and adjacent span lengths exceed 165 feet.

(3) Where there is a downward change in grade at the pole and it is not a guyed or braced corner pole or a cable junction pole.

(4) Where the pole supports only telephone drop wire.

(5) Where the pole carries less than ten communication line wires (on joint use poles), one power line wire shall be counted as two communication wires.

(c) *Methods of testing wood poles.*—One of the following methods or its equivalent shall be used.

(1) Rap the pole sharply with a hammer weighing about 3 pounds, beginning near the ground line and continuing to a height of about 6 feet, going completely around the pole. The hammer will produce a clear sound and rebound sharply when striking sound wood. Decay pockets will be indicated by a dull sound and the hammer rebound is less pronounced. In this case, the pole shall be considered unsafe. Also, prod the pole as near the ground line as possible using a pole prod or a screwdriver with 5 inch or longer blade. If substantial decay is encountered, the pole shall be considered unsafe.

(2) Apply a horizontal force to the pole and attempt to rock it back and forth in a direction across the line. (Caution must be exercised to avoid causing power wires to swing together.) The force may be applied either by pushing with a pike pole or pulling with a rope. If the pole cracks during the test, it shall be considered unsafe.

(d) *Unsafe poles or structures.*—Poles or structures found to be unsafe by test or observation shall not be climbed until made safe by guying, bracing or other adequate means. Poles found unsafe to climb shall, until they are made safe, be tagged in a conspicuous place to alert and warn all employees of the unsafe condition.

(e) *Testing cable suspension strand.*—Before attaching a splicing platform to cable suspension strand, it shall be tested as follows to make sure it has sufficient strength to support the weight of the platform and the employee, except that where the strand crosses above power wires or railroad tracks, an inspection should be made as described in paragraph (f) of this section below. One of the following methods or its equivalent shall be used:

(1) Throw ⅜ inch rope (or larger) over the strand. On joint lines, pass the rope over the strand using tree pruner handles or a wire raising tool. If two employees are present, both shall grip the double rope and slowly transfer their entire weight to the rope. The feet should not be more than about 12 inches above the ground.

(2) If only one employee is present, one end of the rope shall be tied to the bumper of the truck or other equally secure anchorage; the employee shall then grasp the other end of the rope and attempt to raise himself about a foot above the ground.

(f) *Inspection of strand.*—Where strand passes over electric power wires or major railroad tracks, it shall not be tested, but shall be inspected from a convenient working position at both poles supporting the span in question. If any of the following conditions exist, such strand shall not be used to support any splicing platform, scaffold or cable car.

(1) Corrosion so that no galvanizing can be seen.

(2) One or more wires of the strand are broken.

(3) Any worn spots.

(4) Burn marks such as those caused by contact with electric power wires.

(g) *Outside work platforms.*—Safety straps and body belts shall be used while working on elevated work platforms such as aerial splicing platforms, pole platforms, ladder platforms and terminal balconies unless railings are provided.

(h) *Other elevated locations.*—Safety straps and body belts shall be worn to protect employees working at elevated positions on poles, towers or similar structures, which do not have suitably guarded work areas.

(i) *Installing and removing wire and cable.*—Before installing or removing wire or cable, the pole or structure shall be guyed, braced, or otherwise supported as necessary to prevent failure of the pole or structure.

(j) *Avoiding contact with energized power conductors or equipment.*—When setting, moving, or removing poles using cranes, derricks, or other mechanized equipment, precautions shall be taken to avoid contact with energized power conductors or equipment.

(k) *Handling poles near energized power conductors.*—(1) Joint use poles shall not be set, moved or removed by telecommunication employees where the nominal voltage of open electrical power conductors exceed 34.5kv phase to phase (20kv to ground).

(2) Poles shall not be placed, moved or removed during heavy rain, sleet or wet snow fall in joint lines carrying more than 8.7kv phase to phase voltage (5kv to ground) except that poles which have been cut off two feet or more below the level of the lowest power conductor may be removed where the nominal phase to phase voltage does not exceed 34.5kv provided the pole is also cut off near the ground line.

(3) (i) Wet poles being placed, moved or removed where power voltages are over 750 volts, but not over 34.5kv phase to phase voltage (20kv to ground) shall be insulated with either a rubber insulating blanket, a fiberglass box guide or equivalent protective equipment.

(ii) Dry poles being set, moved or removed where power voltages exceed 8.7kv phase to phase (5kv to ground) but do not exceed 34.5kv phase to phase (20kv to ground) shall be insulated with either a rubber insulating blanket, a fiberglass box guide or equivalent.

(iii) Insulation is not required where wet or dry poles are being removed provided the pole is cut off 2 feet or more below the lowest power wire and cut off near the ground line.

(4) Insulating gloves shall be worn by all persons handling the pole either with their hands or with tools throughout the time that there is a possibility that the pole may contact a power conductor. Where the voltage to ground of the power conductor exceeds 15kv to ground, the gloves shall be Class II (ANSI J–6 Stand-

ard). For voltages not exceeding 15kv to ground, insulating gloves shall have a breakdown voltage of at least 17kv.

(5) The guard or insulating material used to protect the pole shall meet the appropriate 3 minute proof test voltage requirements contained in the ANSI J-6.4-1971.

(6) During the time that there is a possibility of contact between the pole or the equipment used to handle it, and an energized power conductor, the following precautions shall be observed by the operator of the equipment:

(i) When on the vehicle which carries the derrick, the employee shall avoid all contact with the ground itself, persons standing on the ground, and all grounded objects such as guys, tree limbs, metal sign posts, etc. If possible, the employee shall remain on the vehicle as long as the possibility of contact exists.

(ii) When it is necessary to leave the vehicle, the employee shall step onto an insulating blanket and break all contact with the vehicle before stepping off the blanket and onto the ground. As a last resort if a blanket is not available, the employee may jump cleanly from the vehicle.

(iii) When it is necessary to enter the vehicle, the employee shall first step onto an insulating blanket and break all contact with the ground, grounded objects and other persons before touching the truck or derrick. As a last resort if a blanket is not available, the employee may jump cleanly onto the vehicle, avoiding all contact with the grounded objects and persons.

(l) *Approach distances.*—No employee shall bring any part of his body, or any conductive tools or conductive objects closer to exposed energized power conductors than the distances permitted in § 1910.331(g) of this part.

(m) *Working position on poles.*—Except as provided in this section, employees shall not climb or work above the level of the lowest electric power conductor on the pole (exclusive of vertical runs and street light wiring). This rule does not apply where the communications facilities are attached above the electric power conductors if a rigid fixed barrier has been installed between the electric power facility and the communications facility. This rule does not apply to cabled secondary service drops carrying less than 300v to ground and attached 40 inches or more below the communitions conductors or cables.

(n) *Metal tapes and ropes.*—(1) Metal measuring tapes, metal measuring ropes, or tapes containing conductive strands shall not be used when working near exposed energized parts.

(2) Where it is necessary to measure clearances from energized parts, only non-conductive devices shall be used.

§ 1910.344 Underground Lines.

The following provisions of this section apply to guarding manholes and street openings and ventilation and testing for gas in manholes and unvented vaults for telecommunications field work on or with underground lines:

(a) *Guarding manholes and street openings.*—(1) When covers of manholes or vaults are removed, the opening shall be promptly guarded by a railing, temporary cover, or other suitable temporary barrier substantial enough to prevent an accidental fall through the opening and suitable to protect persons working in the manhole from foreign objects from above.

(2) While work is being performed in the manhole, a person with basic first aid training shall be immediately available to render assistance if there is cause for believing that a safety hazard exists and the requirements listed under §§ 1910.333(a) and 1910.344(a)(1) of this part do not adequately protect the employee(s). Examples of manhole work site hazards deemed to constitute such cause could include, but are not limited to:

(i) Manhole work sites where safety hazards are created by traffic patterns that cannot be corrected by provisions of § 1910.333(a) "Employee Protection in Public Work Areas."

(ii) Manhole work sites that are subject to unusual water hazards that cannot be abated by conventional means.

(iii) Manhole work sites that are occupied jointly with power utilities as described in § 1910.344(c) of this part.

(b) *Requirements prior to entering manholes and unvented vaults.*—(1) Prior to an employee entering a manhole the following shall be complied with.

(i) The internal atmosphere shall be tested for combustible gas and, except when continuous forced ventilation is provided, the atmosphere shall also be tested for oxygen deficiency.

(ii) When unsafe conditions are detected by testing or other means, the work area shall be ventilated and otherwise made safe before entry.

(2) An adequate continuous supply of air shall be provided while work is performed.

(i) Where combustible or explosive gas vapors have been initially detected and subsequently reduced to a safe level by ventilation.

(ii) Where organic solvents are used in the work procedure.

(iii) Where open flame torches are used in the work procedure.

(iv) In that portion of a public right of way open to vehicular traffic and/or exposed to a seepage of gas or gases, or

(v) Where toxic gases or oxygen deficiency is found.

(3) *Central office cable vaults.*—(i) Central office cable vaults that are adequately vented do not need to comply with § 1910.344(b)(1)&(2) of this part.

(ii) Unvented vaults shall comply with the provisions of § 1910.344(b)(1)&(2) of this part.

(c) *Joint power and telecommunication manholes.*—While work is being performed in a manhole occupied jointly, by an electric utility and a telecommunication utility, an employee shall be available in the immediate vicinity to render emergency assistance as may be required. This shall not preclude the employee in the immediate vicinity from occasionally entering a manhole to provide assistance, other than emergency. This requirement does not preclude a qualified employee, working alone, from entering for brief periods of time, a manhole where energized cables or equipment are in service, for the purpose of inspection, housekeeping, taking readings, or similar work if such work can be performed safely.

(d) *Ladders.*—Ladders shall be used when going in or out of manholes in excess of 4 feet deep.

(e) *Flames.*—Where open flames must be used in manholes, the following special precautions shall be taken to provide protection against combustible gas levels during the period in use.

(1) A test for combustible gas shall be made immediately prior to use of the open flame device.

(2) While using the open flame device, not more than one hour shall elapse without repeating the test for combustible gas.

(3) A fuel tank, e.g. acetylene, shall be in the manhole only when in actual use.

§ 1910.345 Microwave Transmission.

(a) *Eye protection.*—Employees shall not look into an open waveguide which is connected to any energized source of microwave radiation.

(b) *Safe area.*—(1) Accessible areas associated with microwave radio systems where the exposed radiated power density exceeds 10mw/cm² shall be posted in accordance with § 1910.97 of this part. The lower half of the warning symbol shall include the following:

"Radiation in this area may exceed hazard limitations and special precautions are required.

See Instruction_____before entering."

Employees shall not enter an area posted according to above unless one of the following is compiled with:

(i) The power is reduced until the radiated power density is equal to or less than 10mw/cm², (prior to restoring normal operating power levels, the operator shall verify that all employees have been cleared from the posted area); or

(ii) Microwave protective garments are worn as described in paragraph (c) of this section.

(2) Power density in front of microwave transmitting antennas is computed by using the Formula $Wo=4P/A$, where Wo is power density in mw/cm², P is the combined input power in milliwatts and A is the areas of the antenna aperture in square centimeters.

(3) When the temperature is greater than 68°F, a radiation protective garment may be required even with power densities less than 10mw/cm². This is determined by a Temperature Humidity Index (THI) as shown in Table T-2 of this section. When such climatic conditions (THI greater than 70) exist, a microwave radiation protective garment shall be worn if the power density exceeds the value shown in Table T-2 of this section for that THI.

Table T–2

Temperature Humidity Index (THI) (See Note 1)	*Maximum Power Density (mw/cm^2)*
70 or less	10
71	9
72	8
73	7
74	6
75	5
76	4
77	3
78	2
79 or more	1

Note 1: An approximation of the THI (within 1%) above 50% relative humidity (the range of concern) may be obtained from the relation:

$$THI = 0.8T + RH/10 + 5$$

Where T is degrees farenheit and RH is relative humidity in percent.

(c) *Protective garments.*—(1) These garments shall be such that the employee shall not be exposed to microwave radiation greater than $10 mw/cm^2$.

(2) Employees wearing microwave protective garments shall maintain safe distances from exposed electrically energized conductors and equipment. For the purpose of this paragraph (c) of this section, microwave protective garments shall be considered conductive objects and employees shall comply with the distance requirements § 1910.331(g) of this part.

(3) Microwave protective garments shall be inspected by the employee prior to each use to be sure that they are free from tears or ripped seams. Any such tears or rips shall be repaired before using the suit.

(d) *Hot patching.*—An employee shall wear a radiation protective garment when patching waveguide which is propagating RF energy (a procedure known as "hot patching") unless the following safety precautions are complied with:

(1) The total RF input power to the waveguide is 30 watts or less; and

(2) The employee's head and body (excluding limbs) is not permitted closer to the propagating open end of the waveguide than the following distances:

(i) 24 inches from the propagating open end of the waveguide measured along its axis; and

(ii) 12 inches measured perpendicularly from the axis as projected from the propagating open end of the waveguide.

§ 1910.346 Tree Trimming—Electrical Hazards.

(a) *General.* (1) Tree workers shall consider all overhead and underground electrical conductors and all communications wires and cables to be energized with potentially fatal voltages, never to be touched (contacted) either directly or indirectly.

(2) Every tree worker shall be instructed that:

(i) A direct contact is made when any part of the body touches or contacts an energized conductor, or other energized electrical fixture or apparatus.

(ii) An indirect contact is made when any part of the body touches any object in contact with an energized electrical conductor, or other energized fixture or apparatus.

(iii) An indirect contact can be made through conductive tools, tree branches, trucks, equipment, or other objects, or as a result of communications wires, cables, fences, or guy wires being accidentally energized.

(iv) Electric shock will occur when a tree worker, by either direct or indirect contact with an energized conductor, energized tree limb, tool equipment, or other object, provides a path for the flow of electricity to a grounded object or to the ground itself. Simultaneous contact with two energized conductors will also cause electric shock which may result in serious or fatal injury.

(3) The system operator/owner shall be advised before any work is performed in proximity to energized conductors. This rule shall not apply to persons working on behalf of, or employed by, the system operator/owner.

(b) *Working in proximity to electrical hazards.*—(1) A close inspection shall be made by the tree worker and by the man in charge to determine whether an electrical conductor passes through the tree or passes within reaching distance of the tree worker before climbing, entering, or working around any tree. If any of these conditions are found either directly or indirectly, it shall be considered that an electrical hazard exists, unless the system operator/owner has caused the hazard to be removed by deenergizing or installing protective equipment.

(2) Only a qualified line-clearance tree trimmer or qualified line-clearance tree-trimmer trainee will be assigned to the work if it is found that an electrical hazard exists.

(3) During all tree working operations aloft where an electrical hazard of more than 750 V exists, there shall be a second qualified line-clearance tree trimmer or qualified line-clearance tree-trimmer trainee within normal voice communication. This does not apply to utility workers engaged in tree trimming incidental to their normal occupation or to one-man service crews.

(4) Line-clearance tree trimmers and line-clearance tree-trimmer trainees shall maintain clearances from energized conductors as given in Table T–3.

TABLE T–3.—MINIMUM WORKING DISTANCES FROM ENERGIZED CONDUCTORS FOR LINE-CLEARANCE TREE TRIMMERS AND LINE-CLEARANCE TREE-TRIMMER TRAINEES

Voltage Range (phase to phase) (kv):	*Minimum Working Distance*
2.1 to 15.0	2 ft 0 in
15.1 to 35.0	2 ft 4 in
35.1 to 46.0	2 ft 6 in
46.1 to 72.5	3 ft 0 in
72.6 to 121.0	3 ft 4 in
138.0 to 145.0	3 ft 6 in
161.0 to 169.0	3 ft 8 in
230.0 to 242.0	5 ft 0 in
345.0 to 362.0	7 ft 0 in
500.0 to 552.0	11 ft 0 in
700.0 to 765.0	15 ft 0 in

(5) Tree workers shall maintain a minimum clearance of 10 feet from any conductors rated 50 kv or less. For lines rated over 50 kv, the minimum clearance shall be 10 feet plus $\frac{4}{10}$ inch for each kilovolt over 50 kv. If safe clearances cannot be maintained, the system operator/owner shall be contacted to provide adequate protective measures or devices before any work is begun in or near the tree.

(6) Branches hanging on an energized conductor may only be removed using appropriately insulated equipment.

(7) Rubber footwear, including lineman's overshoes, shall not be considered as providing any measure of safety from electrical hazards.

(8) Ladders, platforms, and aerial devices, including insulated aerial devices, shall not be brought in contact with an electrical conductor. Reliance shall not be placed on their dielectric capabilities.

(9) When an aerial lift device contacts an electrical conductor, the truck supporting the aerial lift device shall be considered as energized.

(c) *Storm work and emergency conditions.*—(1) Storm work and emergency conditions create special hazards, and only authorized representatives of the system operator/owner shall perform tree work where conductors are involved.

(2) When an emergency condition develops due to tree operations, work shall be suspended and the system operator/owner shall be notified immediately.

§ 1910.347 Definitions.

(a) *Aerial lift.*—An aerial lift relates to the following types of vehicle-mounted aerial devices used to elevate personnel to job sites above ground:

(1) Extensible boom platforms,

(2) Aerial ladders,

(3) Articulate boom platforms,

(4) Vertical towers,

(5) A combination of any of the above defined in ANSI A92.2–1969. These devices are made of metal, wood, fiberglass reinforced plastic (FRP), or other material and are powered or manually operated; whether or not they are capable of rotating about a substantially vertical axis.

(b) *Aerial splicing platform.*—This consists of a platform approximately 3 ft. x 4 ft. used to perform aerial cable work. It is furnished with fiber or synthetic ropes for supporting the platform from aerial strand, detachable guy ropes for anchoring it and a device for raising and lowering it with a handline.

(c) *Aerial tent.*—A small tent usually constructed of vinyl coated canvas, usually supported by light metal or plastic tubing. It is designed to protect employees in inclement weather while working on ladders, aerial splicing platforms, or aerial devices.

(d) *Alive or live (energized).*—Electrically connected to a source of potential difference, or electrically charged so as to have a potential significantly different from that of the earth in the vicinity. The term "live" is sometimes used in place of the term "current-carrying," where the intent is clear, to avoid repetition of the longer term.

(e) *Barricade.*—A physical obstruction such as types, cones, or "A" frame

type wood and/or metal structure intended to warn and limit access to a work area.

(f) *Barrier.*—A physical obstruction which is intended to prevent contact with energized lines or equipment, or to prevent unauthorized access to work area.

(g) *Battery room.*—A room in which batteries are located and whose aggregate capacity at the 8-hour discharge rate exceeds 5 kilowatt hours.

(h) *Bond.*—An electrical connection from one conductive element to another for the purpose of minimizing potential differences or providing suitable conductivity for fault current or for mitigation of leakage current and electrolytic action.

(i) *Cable.*—A conductor with insulation, or a stranded conductor with or without insulation and other coverings (single-conductor cable) or a combination of conductors insulated from one another (multiple-conductor cable).

(j) *Cable sheath.*—A protective covering applied to cables. NOTE: A cable sheath may consist of multiple layers of which one or more is conductive.

(k) *Circuit.*—A conductor or system of conductor through which an electric current is intended to flow.

(l) *Communication lines.*—The conductors and their supporting or containing structures for telephone, telegraph, railroad signal, data, clock, fire, police-alarm, community television antenna and other systems which are used for public or private signal or communication service, and which operate at potentials not exceeding 400 volts to ground or 750 volts between any two points of the circuit, and the transmitted power of which does not exceed 150 watts. When operating at less than 150 volts no limit is placed on the capacity of the system. Specifically designed communications cables may include communication circuits not complying with preceding limitation, where such circuits are also used incidentally to supply power to communication equipment.

(m) *Conductor.*—A material, usually in the form of a wire, cable, or bus bar suitable for carrying an electric current.

(n) *Effectively grounded.*—Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the build-up of voltages which may result in undue hazard to connected equipment or to persons.

(o) *Equipment.*—A general term which includes fittings, devices, appliances, fixtures, apparatus, and the like, used as part of, or in connection with, a supply or communications installation.

(p) *Ground. (Reference).*—That conductive body, usually earth, to which an electric potential is referenced.

(q) *Ground (as a Noun).*—A conductive connection whether intentional or accidental, by which an electric circuit or equipment is connected to reference ground.

(r) *Ground (as a Verb).*—The connecting or establishment of a connection, whether by intention or accident, of an electric circuit or equipment to reference ground.

(s) *Ground tent.*—A small tent usually constructed of vinyl coated canvas supported by a metal or plastic frame. Its purpose is to protect employees from inclement weather while working at buried cable pedestal sites or similar locations.

(t) *Grounded conductor.*—A system or circuit conductor which is intentionally grounded.

(u) *Grounded systems.*—A system of conductors in which at least one conductor or point (usually the middle wire, or neutral point of transformer or generator windings) is intentionally grounded, either solidly or through a current-limiting device (not a current-interrupting device).

(v) *Grounding electrode conductor. (Grounding conductor).*—A conductor used to connect equipment or the grounded circuit of a wiring system to a grounding electrode.

(w) *Insulated.*—Separated from other conducting surfaces by a dielectric substance (including air space) offering a high resistance to the passage of current.

NOTE: When any object is said to be insulated, it is understood to be insulated in suitable manner for the conditions to which it is subjected. Otherwise, it is within the purpose of these rules, uninsulated. Insulating covering of conductors is one means of making the conductor insulated.

(x) *Insulation (as applied to cable.)*—That which is relied upon to insulate the conductor from other conductors or conducting parts or from ground.

(y) *Joint use.*—The sharing of a common facility such as a manhole, trench or pole by two or more different kinds of utilities (e.g., power and telecommunications).

(z) *Ladder platform.*—Designed to facilitate working aloft from an extension ladder. Consists of a platform (approximately 9" x 18") hinged to a welded pipe frame. The rear edge of platform and the bottom cross-member of the frame are equipped with latches to lock the platform to ladder rungs.

(aa) *Ladder seat.*—A removable seat used to facilitate work at an elevated position on rolling ladders in telecommunication centers.

(bb) *Manhole.*—A subsurface enclosure which personnel may enter and which is used for the purpose of installing, operating and maintaining submersible equipment and/or cable.

(cc) *Manhole platform.*—Consists of separate planks which are laid across steel platform supports. The ends of the supports are engaged in the manhole cable racks.

(dd) *Nominal voltage.*—The nominal voltage of a system or circuit is the value assigned to a system or circuit of a given voltage class for the purpose of convenient designation. The actual voltage may vary above or below this value.

(ee) *Pole balcony or seat.*—This balcony or seat is used as a support for workmen at pole mounted equipment or terminal boxes. It consists of a bolted assembly of steel details and a wooden platform. Steel braces run from the pole to the underside of the balcony. A guard rail (approximately 30" high) may be provided.

(ff) *Pole platform.*—This is intended for use by a workman in splicing and maintenance operations on aerial operations adjacent to a pole. It consists of a platform equipped at one end with a hinged chain binder for securing the platform to a pole. A brace from the pole to the underside of the platform is also provided.

(gg) *Qualified line-clearance tree trimmer.*—A tree worker who through related training and on-the-job experience is familiar with the special techniques and hazards involved in line clearance.

(hh) *Qualified line-clearance tree-trimmer trainee.*—Any worker regularly assigned to a line-clearance tree trimming crew and undergoing on-the-job training who, in the course of such training, has demonstrated his ability to perform his duties safely at his level of training.

(ii) *Qualified personnel.*—Any worker who by reason of his training and experience has demonstrated his ability to safely perform his duties.

(jj) *Qualified tree worker.*—A worker who through related training and on-the-job experience is familiar with the techniques and hazards of tree pruning, trimming, repairing, or removal, and the equipment used in such operations.

(kk) *System operator/owner.*—The person or organization that operates or controls the electrical conductors involved.

(ll) *Telecommunications center.*—An installation of communication equipment under exclusive control of an organization providing telecommunications service, located outdoors, or in a vault, chamber, or building space used primarily for such installations.

NOTE.—Telecommunication centers are facilities established, equipped, and arranged in accordance with engineered plans for the purpose of providing telecommunications service. They may be located on premises owned or leased by the organization providing telecommunication service, or on the premises owned or leased by others. Included in this definition are switch rooms, (whether electromechanical, electronic, or computer controlled), terminal rooms, power rooms, repeater rooms, transmitter and receiver rooms, switchboard operating rooms, cable vaults, and miscellaneous communications equipment rooms. Simulations of telecommunication centers for training or developmental purposes are also included.

(mm) *Telecommunication line truck.*—A truck used to transport men, tools, and material, and to serve as a traveling workshop for telecommunication installation and maintenance work. It is sometimes equipped with a boom and auxiliary equipment for setting poles, digging holes, and elevating material or men.

(nn) *Telecommuncation service.*—The furnishing of a capability to signal or communicate at a distance by means such as telephone, telegraph, police and fire-alarm, community antenna televi-

sion, or similar system, using wire, conventional cable, coaxial cable, wave guides, or microwave transmission or other similar means.

(oo) *Unvented vault.*—An enclosed vault in which the only openings are access openings.

(pp) *Vault.*—An enclosure above or below ground which personnel may enter and is used for the purpose of installing, operating, and/or maintaining equipment and/or cable which need not be of submersible design.

(qq) *Vented vault.*—An enclosure as described in paragraph (pp) above, with provision for air changes using exhaust flue stack(s) and low level air intake(s), operating on differentials of pressure and temperature providing for air flow.

(rr) *Voltage of an effectively grounded circuit.*—The voltage between any conductor and ground unless otherwise indicated.

(ss) *Voltage of a circuit not effectively grounded.*—The voltage between any two conductors. If one circuit is directly connected to and supplied from another circuit of higher voltage (as in the case of an autotransformer), both are considered as of the higher voltage, unless the circuit of lower voltage is effectively grounded, which case its voltage is not determined by the circuit of higher voltage. Direct connection implies electric connection as distinguished from connection merely through electromagnetic or electrostatic induction.

§ 1910.348 Standards Organizations.

Specific standards of the following organizations have been referenced in this subpart. Copies of the referenced standards may be obtained from the issuing organizations. The names and address of the issuing organizations are as follows:

American National Standards Institute (ANSI), 1430 Broadway, New York, N.Y. 10018.

American Society for Testing & Materials (ASTM), 1916 Race Street, Philadelphia, Pa. 19103.

Signed at Washington, D.C., this 18th day of August 1973.

JOHN STENDER,
Assistant Secretary of Labor.

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